

REMARKS

Claims 6 and 7 have been objected to by being directed to a product formed by the method recited in Claim 1. The Examiner's attention is directed to MPEP § 2173.05(p) where it is stated that a product-by-process claim is proper. As such, the Examiner is respectfully requested to withdraw the objection to Claims 6 and 7.

Claims 1 and 5 have been amended in order to more particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically speaking, Claims 1 and 5 now recite that the pretreatment agent consists essentially of the palladium compound reacted or mixed with the silane-coupling agent. Claim 1 also has been amended to cancel language stating that the pretreatment agent is "acidic". Although, as will be explained below, the acidity of the pretreatment agent is an inherent property thereof, this language has been canceled in order to aid the Examiner in finding support for the currently presented claims in parent application Serial No. 10/169 778. Newly presented Claims 8-11 more particularly and distinctly point out the subject matter which Applicants regard as the invention. No new matter has been added.

Claims 1-3, 6 and 7 have been rejected under 35 USC 102(b) as being anticipated by Imori (U.S. 2002-0192379). The Examiner has taken the position that Claims 1-4, 6 and 7 have not been given the benefit of the filing date of the parent application because the parent application does not disclose the claimed limitation of the pretreatment agent being acidic. Applicants respectfully traverse the Examiner's position that Claims 1-4, 6 and 7 are not supported by the parent application. The addition of the language "acidic" into the above-described claims only reflects the inherent properties of the pretreatment agent. That is, if the Examiner will review Example 1 of the present application with Example 1 in parent application Serial No. 10/169 778, she will see that

these Examples are identical with the only difference being that the present application has added the description that the pretreatment agent has a pH of 2.9. It is inherent in the pretreatment agents disclosed in the parent application and those of the present invention that they would have an "acidic pH". Given the components used to form the pretreating agent disclosed in the parent application and the present invention, it is inevitable that the pretreating agent would have an acidic pH. Claiming inherent properties of the pretreatment agent described in the parent application does not deprive the present application from the benefit thereof. If the Examiner maintains her position, she is respectfully requested to provide support for the proposition that claiming inherent properties of a composition described in a parent application deprives a later application from claiming support from the parent application. Otherwise, the Examiner is respectfully requested to withdraw the rejection of Claims 1-3, 6 and 7 under 35 USC 102(b) as being anticipated by Imori (U.S. 2002-0192379).

Claims 1-4, 6 and 7 have been rejected under 35 USC 103(a) as being unpatentable over Simpson in view of Imori. Claim 5 has been rejected under 35 USC 103(a) as being unpatentable over Yamamoto et al in view of Tsuchida et al. Applicants respectfully traverse these grounds of rejection and urge reconsideration in light of the following comments.

The presently claimed invention is directed to a metal plating method comprising the steps of preparing a pretreatment agent consisting essentially of a palladium compound reacted or mixed with a silane-coupling agent obtained by reacting an imidazole-based compound and an epoxysilane-based compound, treating the surface of an object to be plated with the pretreatment agent and electroless plating the plating object. The presently claimed invention is also directed to the metal pretreating agent, a semiconductor wafer having a metal plating layer formed with the metal plating method of the present invention and a

semiconductor device using the semiconductor wafer. The present invention is not shown by the prior art references cited by the Examiner.

Specifically speaking, the instant invention is directed to a method and composition used in the electroless plating of metals onto the surface of a material, specular body, powder or other object having a low electrical conductivity. Conventional methods for electroless plating have problems in that they require that the substrate to be plated be pretreated with a colloidal solution containing highly toxic compounds and require complex treatment steps. The present inventors have discovered that by treating the surface of an object to be plated with a solution consisting essentially of a palladium compound mixed or reacted with a silane-coupling agent obtained by reacting an imidazole-based compound and an epoxy silane-based compound, not only can the palladium process be shortened, the catalyst can also be adequately fixed to the object to be plated. This ensures good metal adhesion to the object to be plated and enables previously difficult-to-plate objects to be effectively plated. The prior art cited by the Examiner does not disclose the presently claimed invention.

With respect to the rejection of claims 1-4, 6 and 7 under 35 USC 103(a) as being unpatentable over Simpson in view of Imori, as stated above, Imori is not available as a reference against the present application and, as such, this rejection is not proper.

The Yamamoto et al reference discloses a catalyst for electroless plating which comprises a divalent palladium compound, a lower alkylamine and an aminopyridine in the form of an aqueous solution having a pH of from 7-14. This reference further discloses that the catalyst aqueous solution can contain a silane-coupling agent to enable the electroless plating of chemical fibers such as polyester fibers and nylon fibers.

The presently claimed invention is distinguishable over Yamamoto et al in that the critical lower alkylamine and aminopyridine of Yamamoto et al are excluded from the metal plating pretreatment agent of the present invention by the "consisting essentially of" language. Additionally, although this reference discloses that the catalyst solution can contain a silane-coupling agent, it is optional. The silane-coupling agent of Yamamoto et al is not the same as the silane-coupling agent required in the present invention and the catalytic solution of Yamamoto et al will exhibit an alkylinity due to the existence of the amine compounds. In contrast thereto, the pretreatment solution of the present invention is acidic and, as such, in order for a proper showing of prima facie obviousness under 35 USC 103(a) to be made, the secondary Tsuchida et al reference must provide the motivation to one of ordinary skill in the art to substitute the claimed silane-coupling agents for the silane-coupling agent disclosed in Yamamoto et al and eliminate the critical alkylamine and aminopyridine components of this reference.

Tsuchida et al discloses Imidazole-silane compounds which have a high heat resistance and corrosion preventative effect on metal surfaces and are capable of improving the adhesion of a metal to a resin substrate. Although this reference discloses silane-coupling agents falling within the scope of the present invention, there is no motivation contained in this reference to substitute the silane-coupling agent for the silane-coupling agent disclosed in Yamamoto et al. Additionally, Tsuchida is concerned with improving the adhesion between a metal and a resin and does not speak at all to using a coupling agent in combination with palladium to pretreat a material that could be subsequently electroless plated. The coupling agent of the present invention has functional molecules which allows it to be fixed onto a substrate to be plated and bind a plating catalyst such as palladium. Tsuchida et al does not disclose this. As such, Applicants respectfully submit that the combination of

Tsuchida et al with Yamamoto et al does not present a showing of prima facie obviousness under 35 USC 103 with respect to the presently claimed invention.

Even though the Examiner has not presented a proper showing of prima facie obviousness under 35 USC 103(a), objective evidence is of record in the present application which is more than sufficient to rebut any proper showing of prima facie obviousness under 35 USC 103(a).

In the Examples contained in the present specification which use a silane coupling agent according to the present invention, excellent plating films are formed. In contrast thereto, in Comparative Example 4, γ -aminopropyltrimethoxysilane was used, which is disclosed in Yamamoto as being a preferred silane-coupling agent, and the results showed that the polyester resin cloth remained mostly devoid of nickel plating. This is clearly unexpected in light of the disclosure of the references cited by the Examiner and affirms the criticality of the claimed silane coupling agent being used.

The Examiner is respectfully requested to reconsider the present application and to pass it to issue.

Respectfully submitted,


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